

# New Species and New Records of Pseudocaeciliidae, Philotarsidae and Elipsocidae (Insecta: Psocoptera) from the Mount Royal Area, Hunter Valley, New South Wales

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Sixteen species of Pseudocaeciliidae, including *Heterocaecilius mouldsi* sp.n., *H. rotundus* sp.n. and *Pseudoscottiella alettae* sp.n., five species of Philotarsidae and four species of Elipsocidae (Insecta: Psocoptera) are recorded from Tuglo Wildlife Refuge, near Mount Royal, New South Wales.

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**KEYWORDS:** Psocoptera, Hunter Valley, New South Wales, Pseudocaeciliidae, Philotarsidae, Elipsocidae.

## INTRODUCTION

This paper records the results of the study of nearly 500 specimens of Psocoptera (Insecta) collected as part of a faunal survey of Tuglo Wildlife Refuge (32°14'S, 151°16'E), near Mount Royal, New South Wales. Sixteen species of Pseudocaeciliidae are represented (including *Heterocaecilius mouldsi* sp.n., *H. rotundus* sp.n., *Pseudoscottiella alettae* sp.n. and the previously unknown male of *Pseudoscottiella papillosa* Schmidt and Thornton) as well as five species of Philotarsidae and four of Elipsocidae. Results for other families of Psocoptera collected during the survey have been dealt with elsewhere (Smithers 1989, 1993b, 1994). The survey is intended to provide a species inventory as a precursor to more detailed studies on the biology and ecology of the group. Survey locality and collecting methods have been briefly described by Smithers (1993a). The survey area (at and near 750 m) lies between the higher altitudes of Barrington Tops and the lower altitudes of the Hunter Valley and so provides a series of habitats between the altitudinal extremes found in the region. The plant associations of the Refuge include several of those found in nearby Mount Royal State Forest (Shields et al. 1992) and most of the Psocoptera mentioned can be expected to occur there. Months in which each species was collected are given in brackets after the species name. The material is deposited in the Australian Museum.

## PSEUDOCAECILIIDAE RECORDED FROM TUGLO WILDLIFE REFUGE

### Previously known species

*Austropsocus antennalis* Thornton and New (December, January)

*Austropsocus costalis* Thornton and New (April, November)

*Austropsocus omega* Thornton and New (June, December)

*Austropsocus sinuosus* (Banks) (January, May, June, December)

*Austropsocus tibialis* Thornton and New (January, May, June, August, September, October)

*Austropsocus viridis* (Enderlein) (January, March, May, June, August, October, December)

*Heterocaecilius brimellus* (Tillyard) (June)

*Heterocaecilius lachlani* (Enderlein) (January, April, May, June, July, August, October, November)

*Lobocaecilius monicus* Lee and Thornton (January, February, May, June, October, December)

*Pseudoscottiella crenulata* New (February, March, April, May, June, September, October, December)

*Pseudoscottiella papillosa* Schmidt and Thornton (January, June, December)

*Pseudoscottiella rotundata* New (April, May, June, October)

*Pseudoscottiella yenooides* Schmidt and Thornton (June)

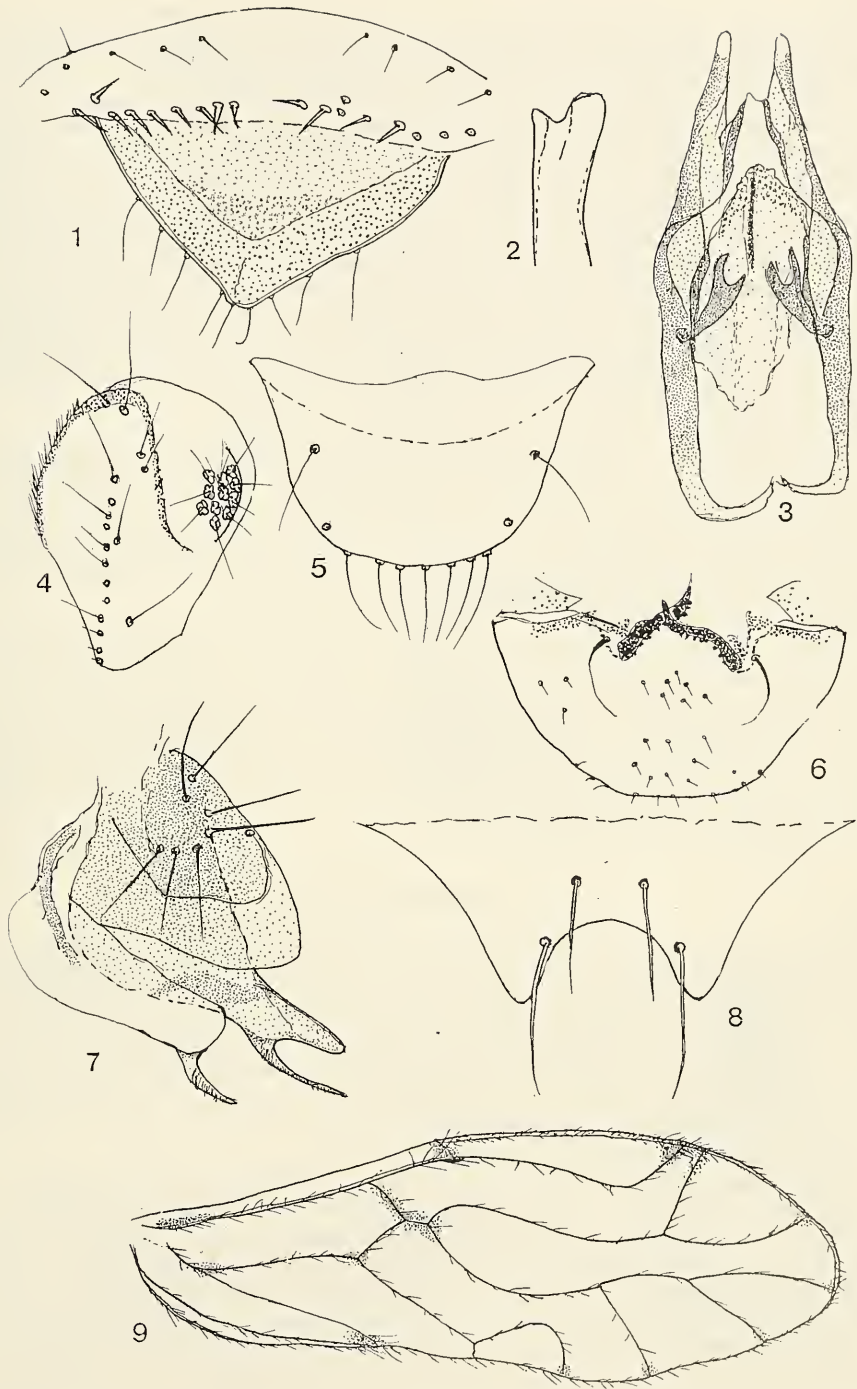
## New species

*Heterocaecilius mouldsi* sp. n.

### Male

Colouration (in alcohol). Head dark cream with purplish W-shaped mark between eyes, middle of the W coinciding with ocellar triangle. Vertex brown, a little paler in middle of each epicranial plate. Postclypeus and labrum dark cream. Genae brownish adjacent to epistomial suture anterior to antennal socket, paler posteriorly. Antennae dark cream, a little paler than postclypeus, scape and pedicel little darker than flagellar segments. Eyes black. Ocellar tubercle black. Maxillary palp as flagellar segments of antennae. Prothorax pale. Meso- and metathorax variously brown above; pleura pale. Legs pale. Fore wings hyaline, faintly marked with brown at end of pterostigma, stigmapophysis. ends of main veins and of Rs and basal section of Rs-M fusion. Veins brown. Hind wings hyaline, veins brown. Abdomen pale.

Morphology. Length of body: 2.6 mm. Median epicranial suture not very obvious. Vertex rounded, setose, with at least one large seta near each eye. Postclypeus with fine, short setae. Length of flagellar segments: f1: 0.70 mm.; f2: 0.52 mm. Antennae clothed with long setae, many of which are several times longer than flagellar diameter. Two small trichoid sensilla on first flagellar segment in basal quarter. Eyes moderately large, just reaching level of vertex. IO/D: 1.6; PO: 0.78. Ocelli large. Lacinia (Fig. 2). Measurements of hind leg: F: 0.65 mm.; T: 1.19 mm.; t1: 0.34 mm.; t2: 0.11 mm.; rt: 3:1; ct: 20.0. Claws with small preapical tooth. Fore wing length: 3.9 mm. Fore wing costa broadened in pterostigma and to wing apex. Stigmapophysis small. Pterostigma gradually broadening distally with a smoothly rounded posterior margin. Pterostigmal area glabrous. Rs and M fusion short but variable. Rs sinuous but not exceptionally so. Areola postica fairly tall, semicircular, smoothly arched. Anal cell without sensilla. Anal margin thickened at hind angle of wing. Hind wing without special features, a few setae on branches of Rs and M. Ninth tergite (Fig. 1) well sclerotised, sparsely setose with a posterior transverse row of about 18 very short, stout setae, the row shortly interrupted medially. Epiproct (Fig. 1) triangular with posterior angle rounded, basally shaped to fit posterior lobe of ninth tergite; a few setae near posterior margin. Hypandrium (Fig. 6) with two sinuous, pointed, papillose apophyses, each with a basal lobe and smaller apophysis. Phallosome (Fig. 3) (slightly tilted in preparation illustrated) symmetrical, a median sclerite on penial bulb, some rugosity and two short curved, forked sclerites; anterior end of phallosome transverse, very narrow in midline.



*Figs. 1-9. Heterocaecilius mouldsi* sp.n. (1) Ninth tergite and epiproct of male; (2) Lacinia; (3) Phallosome; (4) Female paraproct; (5) Female epiproct; (6) Hypandrium; (7) Gonapophyses; (8) Posterior lobes of subgenital plate; (9) Female fore wing.



### Female

Colouration (in alcohol). As male but paler areas on vertex more extensive and with paler area adjacent to median epicranial suture. Fore wing (Fig. 9).

Morphology. Length of body: 2.6 mm. Length of flagellar segments: f1: 0.39 mm; f2: 0.27 mm. Antennae finer than in male, but also strongly setose. Eyes smaller than in male, not reaching level of vertex. IO/D: 3.1; PO: 0.67. Ocelli small. Lacinia as in male. Measurements of hind leg: F: 0.57 mm; T: 0.97 mm; t1: 0.26 mm; t2: 0.09 mm; rt: 2.9:1; ct: 14.0. Preapical tooth on claws not obvious. Fore wing length: 3.0 mm; width: 1.1 mm. Fore wings (Fig. 9). Epiproct (Fig. 5) very large, held vertically with small scattered setae and much stronger marginal setae. Paraproct (Fig. 4) weakly sclerotised with field of closely packed trichobothria with "rosette" bases. Subgenital plate (Fig. 8) with two posterior lobes, each with two strong setae. Gonapophyses (Fig. 7). Ventral valve broad-based, membranous, with strong spiculate distal apophysis. Dorsal valve broad basally, tapering posteriorly with strong preapical, spiculate apophysis. External valve large, lightly sclerotised, divided into two lobes, the smaller lobe setose.

### Material examined

1 male (holotype), Tuglo Wildlife Refuge, 48 km N. Singleton, New South Wales, 6.i.1979, A. S. Smithers. 1 female (allotype), as holotype, 13–14.vii.1976, M. S. Moulds. Other paratypes, locality as holotype: 1 male, 1.ix.1976, 1 male, 1.x.1976, 1 female, 9.ii.1984, 1 female, 3.iii.1984, A. S. Smithers. Holotype and paratypes in Australian Museum. This species is named for Max Moulds, in appreciation of his donation of specimens of Psocoptera to the Australian Museum over many years.

### Discussion

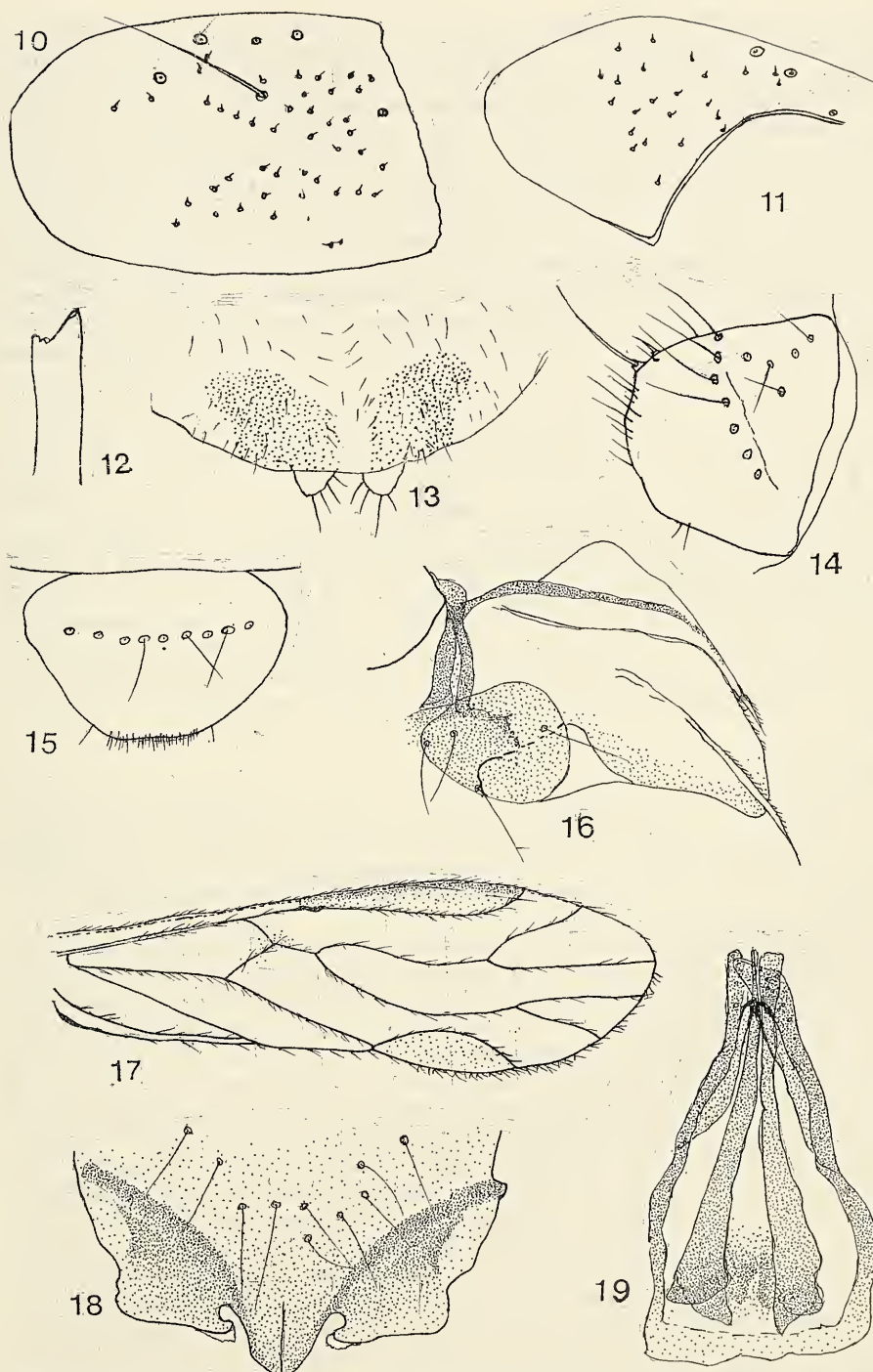
*Heterocaecilius mouldsi* falls well within the definition of the genus as erected by Lee and Thornton (1967). The male phallosome sclerites are characteristic as is the roughened area in the middle of the epiproct. A row of short, stout setae along the hind margin of the ninth tergite is also found in *H. dardanus* Lee and Thornton, from Fiji, but there are fewer setae in the row in *H. mouldsi* than in *H. dardanus*. In the female the double lobes of the external valve of the gonapophyses with the small part alone bearing setae is distinctive and unusual in the genus.

### *Heterocaecilius rotundus* sp. n.

### Female

Colouration (in alcohol). Head dark brown, shining, darker near median epicranial suture and adjacent to compound eyes, the darker areas irregular in shape. Postclypeus very dark brown, almost black along anterior margin. Genae almost black as is the labrum. Antennae pale brown. Eyes black. Thoracic nota and pleura dark brown. Legs brown. Maxillary palps with first segment pale, other segments dark brown. Strongly reduced wings dark brown (Fig. 10). Abdomen brown, dorsally dark brown because of heavy sclerotisation, ventrally membranous areas almost colourless, a few small brown areas where cuticle is more heavily sclerotised.

Morphology. Length of body: 1.8–2.2 mm. Head setose, with some long setae and a fairly dense clothing of finer setae. Median epicranial suture very distinct on vertex but evanescent anteriorly, ending at about level of hind margin of eyes. Vertex sharp, posteriorly overlying prothorax; postclypeus fairly flat so that head appears somewhat prognathous. Length of flagellar segments: f1: 0.3 mm.; f2: 0.2 mm. First flagellar segment with placoid sensillum at about a quarter of length from base and another at about a third from base of segment. Antennae with sparse but well developed setae. Eyes small, set well below level of vertex. IO/D: 2.5; PO: 0.8. No ocelli. Labrum with two trichoid sensilla and three pores arranged alternately along middle section of anterior margin. Labrum slightly lobed at anterior corners. Apex of lacinia (Fig. 12) with a large external tooth and a much smaller inner tooth divided into two minute lobes. Maxillary palp with



Figs. 10–16. *Heterocaecilius rotundus* sp.n. Female. (10) Fore wing; (11) Hind wing; (12) Lacinia; (13) Subgenital plate; (14) Paraproct; (15) Epiproct; (16) Gonapophyses.  
Figs. 17–19. *Pseudoscottiella papillosa*. Male. (17) Fore wing; (18) Hypandrium; (19) Phallosome.

fourth segment long and tapering. Thoracic terga narrow, very strongly sclerotised. Measurements of hind leg: F: 0.51 mm.; T: 0.7 mm.; t1: 0.15 mm.; t2: 0.08 mm.; rt: 1.9:1. No ctenidiobothria and no coxal organ. Fore wing length: 0.18 mm.; width: 0.12 mm. Wings reduced to small, lateral, heavily sclerotised, flap-like extensions of tergum. Fore wings (Fig. 10) with row of setae near anterior margin distal to which is a trichoid sensillum. Basal half of wing with small, scattered, trichoid sensilla. Hind wing (Fig. 11) smaller than fore wing, being merely an extension of thoracic tergum, with two anterior setae near base, beyond and behind which is an area bearing small scattered trichoid sensilla. Abdomen heavily sclerotised dorsally with most of the terga fused. Sixth tergite demarcated from fused tergites anterior to it by a shallow suture, tergites 7–9 separate from each other. Heavy sclerotisation of the thoracic and abdominal terga and micropterous condition give the insects a beetle-like appearance. Abdominal terga each with irregular, transverse row of strong setae. Epiproct (Fig. 15) very heavily sclerotised with surface very finely sculptured with irregular, granular pattern (not indicated in figure) and single row of about nine strong setae. Hind margin curved, middle posterior section bearing group of fine setae. Paraproct (Fig. 14) heavily sclerotised with row of strong setae across middle adjacent to a fold in integument and with few, spaced, fine setae in area usually occupied by trichobothrial field, none with basal "rosettes". Surface of paraproct finely "granular" as in epiproct (not indicated in illustration). Hind margin of paraproct finely setose, as epiproct. No posterior cone on margin but a tiny seta is flanked ventrally by a very large and dorsally by a small seta. Epiproct and paraproct are so shaped that their margins are opposed to each in life, thus sealing off the apex of the abdomen. Subgenital plate (Fig. 13) posteriorly bilobed, each lobe with few marginal setae. Gonapophyses (Fig. 16) with ventral valve with broad membranous flap supported by narrow longitudinal sclerotised rod. Dorsal valve very broad, lightly sclerotised, with narrow, spiculate apophysis. External valve with few long fine setae (four in holotype).

#### Male

Unknown.

#### Material examined

1 female (holotype), in litter, alongside stream in rainforest, Tuglo Wildlife Refuge, 48 km. N. Singleton, New South Wales, 9.vii.1983. L.E. Watrous. 11 females, data as holotype. 2 females, in rainforest litter, alongside Turkey Creek, Tuglo Wildlife Refuge, 23.vii.1983. L.E. Watrous. Holotype and paratypes in Australian Museum.

#### Discussion

Lee and Thornton (1967) erected *Heterocaecilius* to hold species of Pseudocaeciliidae which could not be placed in other genera, several of which they established in the same publication. Microptery and brachyptery are common in adults of several families of Psocoptera but has seldom been reported in the Pseudocaeciliidae. *Diplocaecilius* Badonnel (a monotypic genus) and *Heterocaecilius nigricans* Badonnel, both from Madagascar, are, however, micropterous. *H. rotundus* is very similar to the latter species, sharing many of the features which are considered to be neotenic and associated with microptery in Psocoptera. These include loss of ocelli, loss of trichobothrial field and reduction or loss of coxal organ. Neither species, however, exhibits retention of a duplex seta or marginal cone on the hind margin of the paraproct, such retention also being a common neotenic feature. This does occur in *Diplocaecilius*. *H. rotundus* and *H. nigricans* stand apart from other species of *Heterocaecilius* by virtue of their microptery. It is not clear from the description of *H. nigricans* whether there is fusion of the abdominal tergites to the extent that this occurs in *H. rotundus* but the description of the colour of that species (dark dorsally, pale ventrally) suggests that this may be so. *H. rotundus* is distinguished from the also-micropterous *Diplocaecilius peyrierasi* Badonnel by the form of the genitalia which, in *Diplocaecilius* have a doubly lobed dorsal valve (single lobe in *H. rotundus*) and in lacking the marginal cone on the paraproct (present in *Diplocaecilius*). The only known species with which *H. rotundus* could be confused is *H.*



*nigricans*. It differs from that species in details of the form of the gonapophyses, in the shape of the area of sclerotisation of the subgenital plate, in having four setae on each subgenital plate lobe (two in *H. nigricans*) in lacking setae with "rosette" bases on the paraproct (two such in *H. nigricans*) and in having more setae on the reduced wings (two setae in *H. nigricans*). The fore wings in *H. nigricans* also bear a single trichoid sensillum. This is not present on the hind wing. A sensillum is present in the same position on the fore wing of *H. rotundus* but this species has a fairly extensive field of additional sensilla in the basal half of both fore and hind wings.

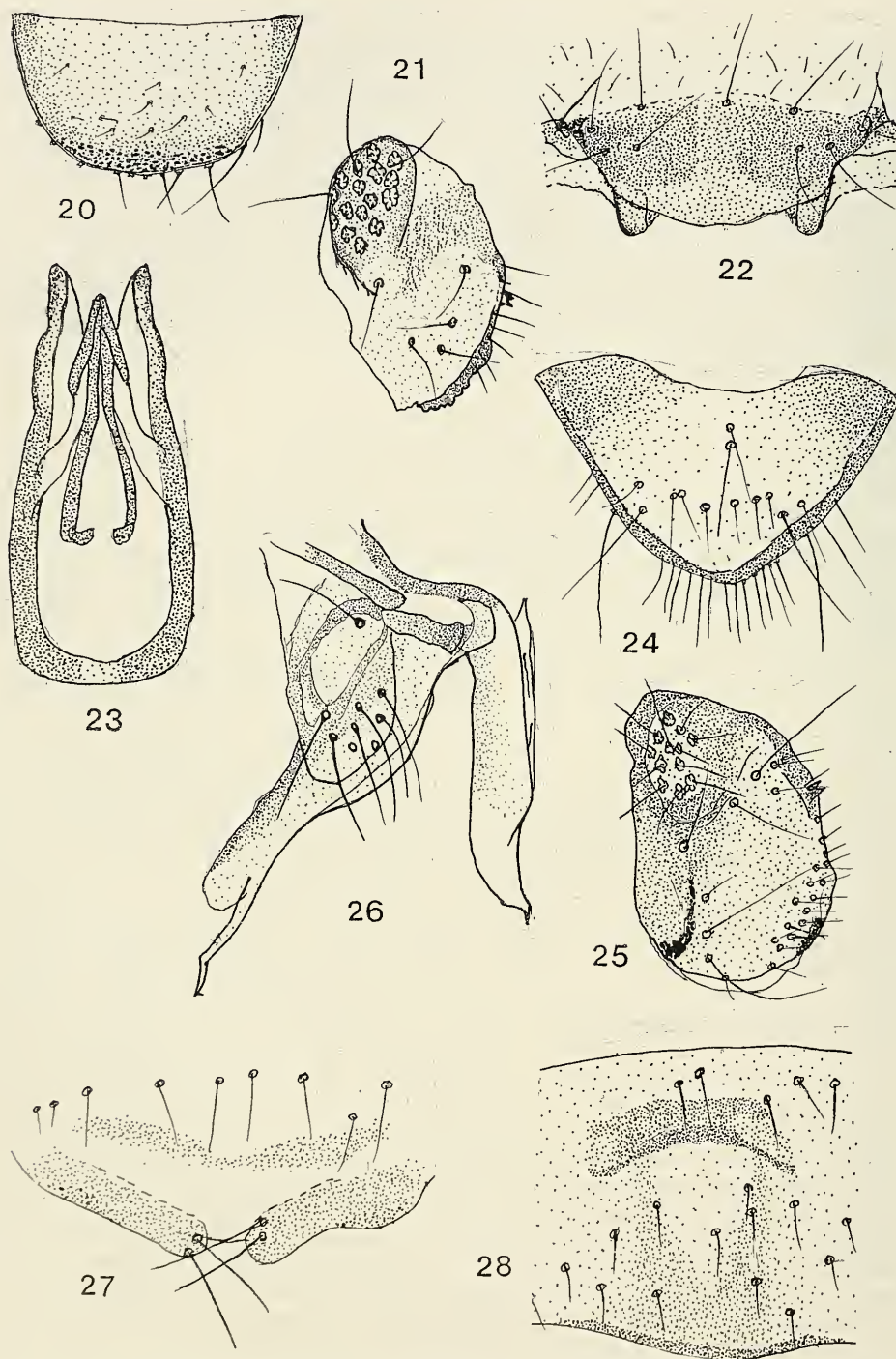
*H. nigricans* and *H. rotundus* appear to have undergone remarkable parallel evolution in Madagascar and Australia. Unfortunately, males are not known for either species so it would be preferable to retain them in *Heterocaecilius*, bearing in mind that they are anomalous in that genus and that with greater knowledge it may be necessary to place them in a separate genus.

*Pseudoscottiella alettae* sp.n.

Male

Colouration (in alcohol). Head brown with slightly paler, broad transverse bands between compound eyes. Antennae brown, distally paler. Eyes black. Ocellar tubercle not darker than surrounding cuticle. Maxillary palps pale, fourth segment pale brown. Mesonotum brown with paler central area and pale, fine median stripe on antedorsum. Legs uniformly pale. Fore wings hyaline, with brown pattern as in *Pseudoscottiella tanei* Smithers (Smithers 1977, fig. 66).

Morphology. Length of body: 2.3 mm. Median epicranial suture distinct, anterior arms present but less obvious. Vertex somewhat flattened with long, erect setae, some of which are curved; a row of very long setae across vertex, the longest in the row reaching back almost to base of fore wing. Length of flagellar segments: f1: 0.49 mm.; f2: 0.24 mm. Antennae with long, erect setae, much longer than diameter of flagellum. Eyes large but not reaching level of vertex. IO/D: 2.0; PO: 0.83. A few small hairs between ocelli and two long setae arising from posterior edge of ocellar tubercle between lateral ocelli. Measurements of hind leg: F: 0.40 mm.; T: 0.81 mm.; t1: 0.22 mm.; t2: 0.11 mm.; rt: 2:1; ct: 14.0. Claws without preapical tooth. Fore wing length: 2.75 mm; width: 0.85 mm. Fore wing long and narrow, widening gradually to widest part. Costa very broad in pterostigma, about a third as wide as pterostigma opposite widest part. Costa broad to wing apex but not as broad as in pterostigma. Rs and M fusion long. Rs distal to separation from M almost straight. R<sub>2+3</sub> slightly sinuous. R<sub>4+5</sub> straight, ending at wing apex. Fork of M beyond radial fork but before end of areola postica. Areola postica long and narrow. Setae well developed on all veins except Cu<sub>2</sub> and at base of hind margin, where margin is slightly thicker at anal angle. Hind wing length: 2.0 mm.; width: 0.54 mm. Hind wing without setae on veins except distal part of R<sub>1</sub>. Main marginal setae from R<sub>1</sub> to anal angle of two lengths, longer setae alternating with shorter, some of the latter lying at an angle to the large setae. Hind margin of ninth tergite thickened and slightly rugose on each side of epiproct. Epiproct (Fig. 20) with strongly sclerotised margin, body of epiproct more heavily sclerotised towards edges than elsewhere; coarsely rugose near posterior margin. Paraproct (Fig. 21) with ovoid trichobothrial field of about sixteen trichobothria with finely ridged "rosettes" and a small seta at one end of field. Paraproct with a few long, scattered setae, a row of setae and a double cone on hind margin. Hypandrium (Fig. 22) with posterior rounded lobe at each side and sinuous hind margin between them. Phallosome (Fig. 23) with somewhat transverse anterior end, weakly sclerotised in middle of anterior end. Sclerification of penial bulb in form of a pair of posteriorly tapering rods, separate at the base and each bent at a small, partially separated, basal sclerite.



Figs. 20–28. *Pseudoscottiella alettae* sp.n. (20) Male epiproct; (21) Male paraproct; (22) Hypandrium; (23) Phallosome; (24) Female epiproct; (25) Female paraproct; (26) Gonapophyses; (27) Posterior lobes of subgenital plate; (28) Ninth tergite of female.



### Female

Colouration (in alcohol). As in male but vertex, frons and postclypeus ivory instead of various shades of brown. Fore wing pattern similar to that of male but with middle part of cell  $R_3$  to  $Cu_{1a}$ . Hind wing with broad, transverse, irregular pale brown band.

Morphology. Length of body: 2.3 mm. Median epicranial suture distinct, anterior arms not evident. Vertex, frons and postclypeus wider than in male and all in same plane, that is, head appearing flat and broad with a sloping upper surface. Length of flagellar segments: f1: 0.27 mm.; f2: 0.19 mm. Eyes smaller than in male, well below level of vertex when seen from the side. IO/D: 3.2; PO: 0.8. No ocelli. Measurements of hind leg: F: 0.43 mm.; T: 0.7 mm.; t1: 0.19 mm.; t2: 0.094 mm.; rt: 2:1; ct: 11:0. Fore wing length: 2.3 mm.; width: 0.73 mm. Fore wing form and venation as in male, also with slight thickening of hind margin at anal angle. In one specimen M not branched, reaching margin as single vein in both wings. Hind wing as in male. Epiproct (Fig. 24) with rounded margin, well sclerotised with narrow, heavily sclerotised edge; few setae. Paraproct (Fig. 25) with strongly developed posterior double cone, trichobothrial field of about twelve trichobothria. Ninth tergite (Fig. 28) with strongly sclerotised, slightly curved margin opposite epiproct. Subgenital plate (Fig. 27). Gonapophyses (Fig. 26).

### Material examined

5 males (including holotype), 2 females (including allotype), Tuglo Wildlife Refuge, 49 km N. Singleton, New South Wales, 17.xii.1978, A.S.Smithers. 1 female, same locality, 18.v.1974. 1 female, same locality, 1.x.1978. 1 female, same locality, 21.x.1978. 1 female, same locality, 24.vi.1980. A.S.Smithers. Holotype and paratypes in the Australian Museum. This species is named for my wife, who collected most of the specimens in the Tuglo Wildlife Refuge survey.

### Discussion

The only Australian species of *Pseudoscottiella* with which *Ps. alettae* might be confused on general appearance are *Ps. tanei* Smithers and *Ps. yenoides*. The eyes of *Ps. alettae* are larger than those of *Ps. tanei*. The male phallosome of *Ps. tanei* has broad outer parameres and the fused apices of the inner parameres are spiculate whereas in *Ps. alettae* the outer parameres are narrow and the inner not apically spiculate. Anteriorly the phallosome is broad and transverse in *Ps. alettae* but is narrowed in *Ps. tanei*. In the females the most obvious differences are to be seen in the posterior lobes of the subgenital plate. Beyond Australia only *Ps. ornatus* (Banks), from Guam, has a similar wing pattern but in that species the phallosome has apically spiculate inner parameres and the outer parameres are narrow, with spatulate ends. The sclerites of the penial bulb are clearly different from those of *Ps. alettae* in proportions, being long, thin and inwardly curved, crossing distally. The female of *Ps. ornatus* has not been described. The genitalia of *Ps. alettae* are very similar to those of *Ps. yenoides* but differ in some details. The wing pattern, on the other hand, differs considerably. In male *Ps. yenoides* there is no pattern. In the female the coloured areas are less extensive than in *Ps. alettae* and confined to the basal two thirds of the wing. The male epiproct differs in the two species, being rounded behind in *Ps. alettae* but more transverse in *Ps. yenoides*. The paraproct of male *Ps. yenoides* has about ten trichobothria, whereas there are about sixteen in *Ps. alettae*. The hypandrium of *Ps. alettae* has lateral lobes which are not present in *Ps. yenoides*.

### **First description of the male of *Pseudoscottiella papillosa***

*Pseudoscottiella papillosa* Schmidt and Thornton, 1992.

Schmidt and Thornton (1992) did not have male material of this species. Material collected in the survey includes 3 females and 2 males, the latter providing the material on which the following description is based.

Male

Colouration (in alcohol). Head, body and appendages pale creamy white. Fore wing (Fig. 17) hyaline, pterostigma greyish, opaque, suggestion of pale brown in areola postica. Veins pale. Hind wings hyaline, veins pale.

Morphology. Length of body: 1.9 mm. Median epicranial suture distinct, anterior arms evanescent. Head setose, with a pair of exceptionally long, fine setae arising from each epicranial plate and curving back above prothorax. Hind margin of head slightly sinuous between compound eyes. Length of flagellar segments: f1: 0.54 mm.; f2: 0.27 mm. First flagellar segment slightly curved. Eyes very large, on sides of head but upper margin only just level with vertex. IO/D: 0.8; PO: 0.8. Apex of lacinia divided, outer tine much larger than inner. Fourth segment of maxillary palp long and narrow, length 3.7 times width. Measurements of hind leg: F: 0.45 mm.; T: 0.78 mm.; t1: 0.24 mm.; t2: 0.08 mm.; rt: 3:1, ct: 16:0. Claws without preapical tooth. Pulvilli broad, apically very broad. Fore wing length: 2.5 mm.; width: 0.81 mm. Stigmapophysis shallow. Costa a little more heavily sclerotised in basal third of pterostigma than elsewhere. Rs-M fusion long, stem of Rs somewhat sinuous as is  $R_{2+3}$ . Rs and M branch opposite widest part of pterostigma. Veins, except  $Cu_2$ , setose. Wing margin slightly thickened at anal angle. Hind wing Rs-M fusion long.  $R_{4+5}$  reaches wing margin behind apex. Veins without setae, except for  $R_1$  near wing margin. Ninth tergite with hind margin with a group of papillae on each side of midline, the middle part of the margin smooth, gently curved. Epiproct simple, more or less triangular, with a few scattered setae. Paraproct similar to that of *H. alettae* sp. n. (described below). Hypandrium (Fig. 18). Phallosome (Fig. 19) with external parameres slightly expanded towards tip and somewhat spatulate. Internal parameres likewise, without apical spicules. Penial bulb with sclerotised rods which are flattened and broadened towards tip.

Material examined

2 males, 1 female, 17.xii.1978, 1 female, 24.vi.1980. 1 female, 3.i.1988. A.S. Smithers.

Discussion

The male of *P. papillosa* is easily recognised by the parameres which are broadened, somewhat flattened and spatulate, of a shape not previously recorded in the genus.

## PHILOTARSIDAE RECORDED FROM TUGLO WILDLIFE REFUGE

*Haplophallus sinus* Thornton and New (January, June, November)

*Latrobiella guttata* (Tillyard) (January, May, June)

*Latrobiella medialis* (Thornton and New) (April)

*Latrobiella ornata* (Thornton and New) (January, May)

*Latrobiella paraguttata* Thornton and New (November)

## ELIPSOCIDAE RECORDED FROM TUGLO WILDLIFE REFUGE

*Paedomorpha gayi* Smithers (May, June)

*Pentacladus eucalypti* Enderlein (January, February, June, August, October, November, December)

*Propsocus pulchripennis* (Perkins) (January, February, March, April, May, August, October, November, December)

*Spilopsocus ruidis* Smithers (June, August)

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